



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)
Faculty of Engineering and Technology

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

Institutional Based Program

HIGHER DIPLOMA IN BUILDING & CIVIL ENGINEERING

EBC 3115: CONSTRUCTION PLANT & EQUIPMENT

END OF SEMESTER EXAMINATION

SERIES: APRIL 2012

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions

Answer question **ONE** and any other **TWO** questions

Maximum marks for each part of a question are clearly shown

This paper consists of **THREE** printed pages

SECTION I (Compulsory)

Question 1 (20 marks)

- a) List down **SIX** reasons for employing construction plant and equipment (6 marks)
- b) Name any **THREE** types of explosives and for each give their uses (6 marks)
- c) Discuss the **FOUR** factors that affect productive of excavation plant (8 marks)
- d) With the aid sketches differentiate between the following plant and equipment (10 marks)
 - (i) Face shovel
 - (ii) Scotch derrick crane
 - (iii) Tilting drum mixer
 - (iv) Tandem roller
 - (v) Continuous flight auger

SECTION II (Answer any TWO questions)

Question 2 (20 marks)

- a) Sketch and give the use of each of the following compacting plant (12 marks)
 - (i) Poker vibrator
 - (ii) Vibrating beam screed
 - (iii) Sheepsfoot roller
 - (iv) Power rammer
- b) List down **TWO** factors that affect productivity of bitumen laying plant (2 marks)
- c) A basement of size 12m wide x 22m long x 5m deep is to be excavated by a back actor of shovel capacity 1.5m^3 . Its cycle time is 2.5mins and machine works at 90% efficiency. The soil to be excavated bulks at 25%. How long will it take to complete the excavation if it works for 9hours per day (4 marks)

Question 3 (20 marks)

- a) Sketch and give the use of each of the following concreting plant. (12 marks)
 - (i) Non-tilting drum mixer
 - (ii) Paddle mixer
 - (iii) Truck mounted mixer
 - (iv) Pan mixer
- b) List down **TWO** factors that affect productivity of piling plant and equipment (2 marks)
- c) A contractor has a mixer with a drum capacity of 0.45m^3 . The amount of concrete required is 200m^3 . The machine works as 80% efficiency. Assuming a 9hr day, how long will it take to complete the work in a day? (4 marks)

Question 4 (20 marks)

- a) Sketch and give the use of each of the following transporting and lifting plant. (12 marks)
- (i) Bottom dumper
 - (ii) Track mounted crane
 - (iii) Forward dumper
 - (iv) Dependent crane
- b) Clearly give the procedure for blasting (4 marks)
- c) Discuss the **TWO** factors that affect the choice of driving hammers (4 marks)

Question 5 (20 marks)

- a) Discuss the sketch the following drilling methods (8 marks)
- (i) Rotary drilling
 - (ii) Percussion drilling
- b) Discuss the **FOUR** factors that affect the selection of excavators. (8 marks)
- c) Determine the productivity of a roller given the following data: (4 marks)
- | | | |
|---------------------------------|---|---------|
| Working day | = | 9 hours |
| Working week | = | 6 days |
| Roller width | = | 2.03m |
| Minimum number of passes | = | 2 |
| Roller speed | = | 2 Kph |
| Overlap at each end of the drum | = | 0.015m |
| Maximum compacted thickness | = | 200mm |
| Efficiency of roller | = | 85% |
| Number of passes (N) | = | 2 |